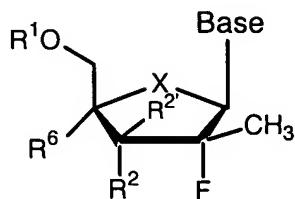


WE CLAIM:

1. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

5

Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R , S , or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

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R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

15

20

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl),

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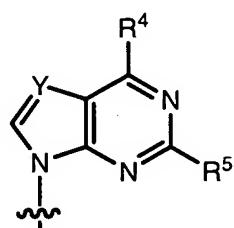
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$\text{SO}_2(\text{C}_{1-4}$ acyl), $\text{SO}_2(\text{C}_{1-4}$ alkyl), $\text{SO}_2(\text{C}_{1-4}$ alkynyl), $\text{SO}_2(\text{C}_{1-4}$ alkenyl), $\text{O}_3\text{S}(\text{C}_{1-4}$ acyl), $\text{O}_3\text{S}(\text{C}_{1-4}$ alkyl), $\text{O}_3\text{S}(\text{C}_{1-4}$ alkenyl), NH_2 , $\text{NH}(\text{C}_{1-4}$ alkyl), $\text{NH}(\text{C}_{1-4}$ alkenyl), $\text{NH}(\text{C}_{1-4}$ alkynyl), $\text{NH}(\text{C}_{1-4}$ acyl), $\text{N}(\text{C}_{1-4}$ alkyl)₂, $\text{N}(\text{C}_{1-18}$ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N_3 , CN, one to three halogen (Cl, Br, F, I), NO_2 , $\text{C}(\text{O})\text{O}(\text{C}_{1-4}$ alkyl), $\text{C}(\text{O})\text{O}(\text{C}_{1-4}$ alkyl), $\text{C}(\text{O})\text{O}(\text{C}_{1-4}$ alkynyl), $\text{C}(\text{O})\text{O}(\text{C}_{1-4}$ alkenyl), $\text{O}(\text{C}_{1-4}$ acyl), $\text{O}(\text{C}_{1-4}$ alkyl), $\text{O}(\text{C}_{1-4}$ alkenyl), $\text{S}(\text{C}_{1-4}$ acyl), $\text{S}(\text{C}_{1-4}$ alkyl), $\text{S}(\text{C}_{1-4}$ alkynyl), $\text{S}(\text{C}_{1-4}$ alkenyl), $\text{SO}(\text{C}_{1-4}$ acyl), $\text{SO}(\text{C}_{1-4}$ alkyl), $\text{SO}(\text{C}_{1-4}$ alkynyl), $\text{SO}(\text{C}_{1-4}$ alkenyl), $\text{SO}_2(\text{C}_{1-4}$ acyl), $\text{SO}_2(\text{C}_{1-4}$ alkyl), $\text{SO}_2(\text{C}_{1-4}$ alkynyl), $\text{SO}_2(\text{C}_{1-4}$ alkenyl), $\text{O}_3\text{S}(\text{C}_{1-4}$ acyl), $\text{O}_3\text{S}(\text{C}_{1-4}$ alkyl), $\text{O}_3\text{S}(\text{C}_{1-4}$ alkenyl), NH_2 , $\text{NH}(\text{C}_{1-4}$ alkyl), $\text{NH}(\text{C}_{1-4}$ alkenyl), $\text{NH}(\text{C}_{1-4}$ alkynyl), $\text{NH}(\text{C}_{1-4}$ acyl), $\text{N}(\text{C}_{1-4}$ alkyl)₂, $\text{N}(\text{C}_{1-4}$ acyl)₂, OR^7 ; R^2 and R^2 can be linked together to form a vinyl optionally substituted by one or two of N_3 , CN, Cl, Br, F, I, NO_2 ; and

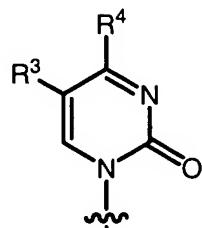
R^6 is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH_3 , OCH_3 , OCH_2CH_3 , hydroxy methyl (CH_2OH), fluoromethyl (CH_2F), azido (N_3), CHCN , CH_2N_3 , CH_2NH_2 , CH_2NHCH_3 , $\text{CH}_2\text{N}(\text{CH}_3)_2$, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof.

2. The (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of claim 1 or its pharmaceutically acceptable salt or prodrug thereof, wherein Base is selected from the group consisting of:



(a)



(b)

25

wherein

Y is N or CH.

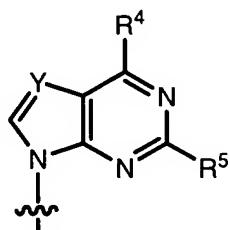
R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

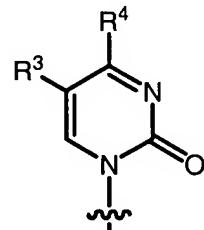
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3. The (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) of claim 1 or its pharmaceutically acceptable salt or prodrug thereof,

wherein Base is selected from the group consisting of (a) or (b):



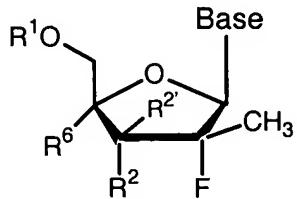
20 (a)



(b)

and wherein R¹ is H, R² is OH, R^{2'} is H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

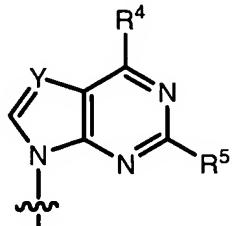
4. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



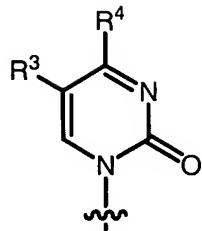
wherein

5

Base is selected from the group consisting of



(a)



(b)

Y is N or CH;

10 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

15

20

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C_{1-C₆}, halogenated (F, Cl, Br, I) lower alkyl of C_{1-C₆} such as CF₃ and CH₂CH₂F, lower alkenyl of C_{2-C₆} such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C_{2-C₆} such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C_{2-C₆} such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C_{2-C₆}, lower alkoxy of C_{1-C₆} such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C_{1-C₆}, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

R' is an optionally substituted alkyl of C_{1-C₁₂} (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C_{2-C₆}

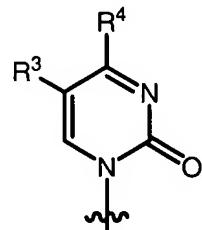
C_6 , optionally substituted lower alkenyl of C_2 - C_6 , or optionally substituted acyl;

5 R^6 is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH_3 , OCH_3 , OCH_2CH_3 , hydroxy methyl (CH_2OH), fluoromethyl (CH_2F), azido (N_3), $CHCN$, CH_2N_3 , CH_2NH_2 , CH_2NHCH_3 , $CH_2N(CH_3)_2$, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof.

10 5. The ($2'R$)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) of claim 4 or its pharmaceutically acceptable salt or prodrug thereof, wherein

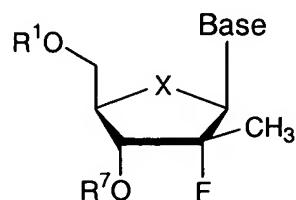
15 Base is



and R^1 is H, R^2 is OH, R^3 is H, R^4 is NH_2 or OH, and R^6 is H.

15

6. A ($2'R$)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof of the structure:



wherein Base is a purine or pyrimidine base;

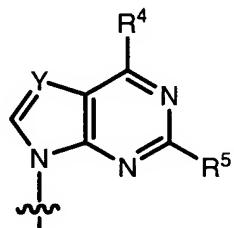
X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group.

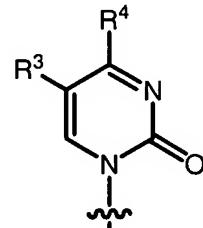
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7. The (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of claim 6 or its pharmaceutically acceptable salt or prodrug thereof,

wherein Base is selected from the group consisting of:



(a)



(b)

Y is N or CH;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl,

5

Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

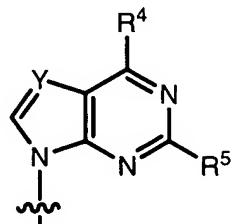
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R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

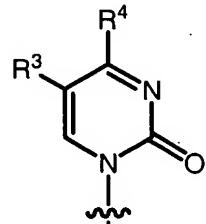
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8. The (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) of claim 6 or its pharmaceutically acceptable salt or prodrug thereof,

wherein Base is selected from the group consisting of (a) or (b):



(a)

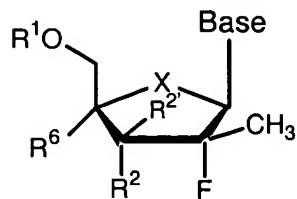


(b)

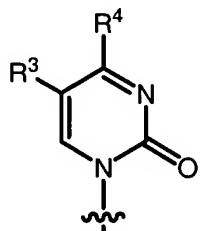
and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

20

9. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein Base is



5 X is O, S, CH₂, Se, NH, N-alkyl, CHW (R , S , or racemic), C(W)₂, wherein W
is F, Cl, Br, or I;

10 R¹ and R⁷ are independently H, phosphate, including monophosphate,
diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including
optionally substituted phenyl and lower acyl, alkyl, including lower
alkyl, O-substituted carboxyalkylamino or its peptide derivatives,
sulfonate ester, including alkyl or arylalkyl sulfonyl, including
methanesulfonyl and benzyl, wherein the phenyl group is optionally
substituted, a lipid, including a phospholipid, an L or D-amino acid (or
racemic mixture), a carbohydrate, a peptide, a cholesterol, or other
pharmaceutically acceptable leaving group which when administered *in vivo*
is capable of providing a compound wherein R¹ is H or phosphate;
R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic
phosphate group;

15 R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃,
CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄
alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄

alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R² can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

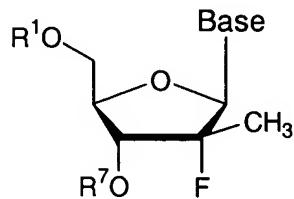
R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C_{1-C₆}, halogenated (F, Cl, Br, I) lower alkyl of C_{1-C₆} such as CF₃ and CH₂CH₂F, lower alkenyl of C_{2-C₆} such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C_{2-C₆} such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C_{2-C₆} such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C_{2-C₆}, lower alkoxy of C_{1-C₆} such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C_{1-C₆}, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

R' is an optionally substituted alkyl of C_{1-C₁₂} (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C_{2-C₆}, optionally substituted lower alkenyl of C_{2-C₆}, or optionally substituted acyl.

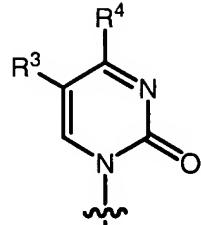
R^6 is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH_3 , OCH_3 , OCH_2CH_3 , hydroxy methyl (CH_2OH), fluoromethyl (CH_2F), azido (N_3), $CHCN$, CH_2N_3 , CH_2NH_2 , CH_2NHCH_3 , $CH_2N(CH_3)_2$, alkyne (optionally substituted), or fluoro;

5 or its pharmaceutically acceptable salt or prodrug thereof.

10. A ($2'R$)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula



10 wherein Base is



15 R^1 and R^7 are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered in
20

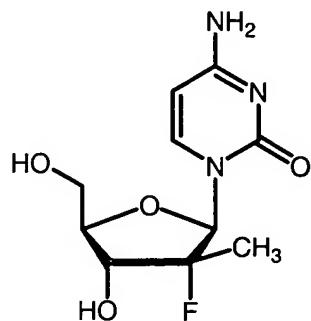
vivo is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

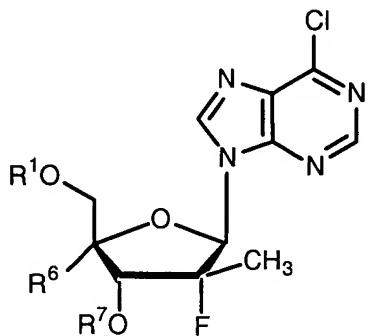
R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

or its pharmaceutically acceptable salt or prodrug thereof.

11. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its
20 pharmaceutically acceptable salt or prodrug thereof of the formula:



12. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



wherein

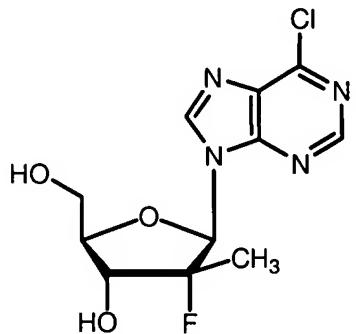
5 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

10

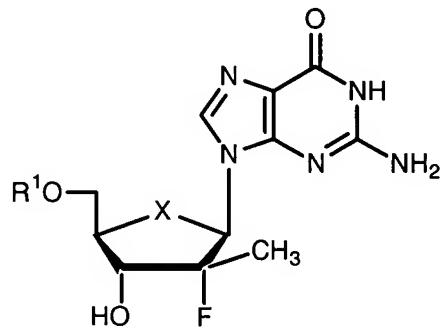
15 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro.

20

13. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



5 14. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



wherein

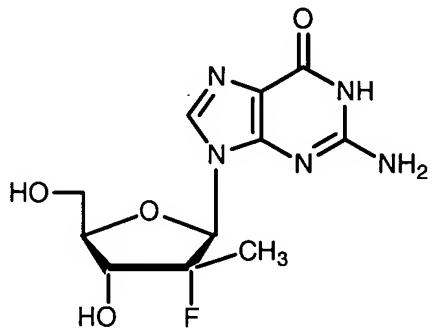
X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

10 R¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other

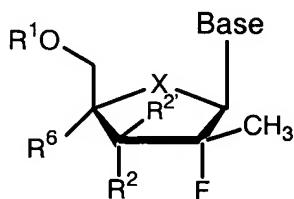
15

pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate.

15. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its
5 pharmaceutically acceptable salt or prodrug thereof of the formula:



16. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



10

wherein

Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

15 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives,

5 sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

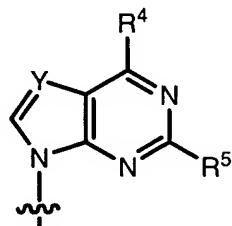
10 R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

25 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F),

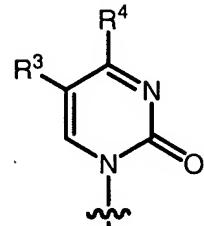
azido (N_3), CHCN , CH_2N_3 , CH_2NH_2 , CH_2NHCH_3 , $\text{CH}_2\text{N}(\text{CH}_3)_2$, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof, a pharmaceutically acceptable carrier.

5 17. The composition of claim 16, wherein Base is selected from the group consisting of:



(a)



(b)

wherein

10 Y is N or CH.

15

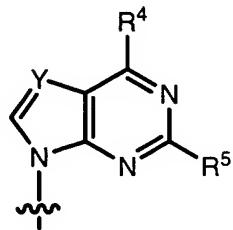
R^3 , R^4 and R^5 are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

20

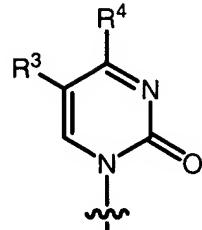
R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

18. The composition of claim 16, wherein

Base is selected from the group consisting of (a) or (b):



(a)

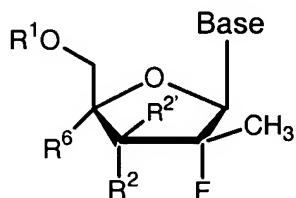


(b)

5 and wherein R¹ is H, R² is OH, R^{2'} is H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

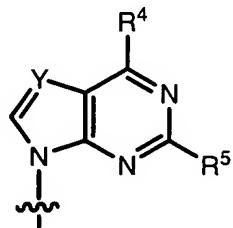
19. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:

10

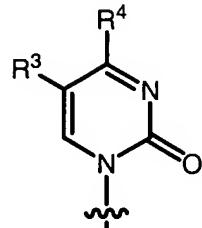


wherein

Base is selected from the group consisting of



(a)



(b)

15

Y is N or CH;

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl)

alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

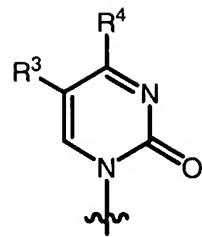
R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof in a pharmaceutically acceptable carrier.

20. The composition of claim 19, wherein

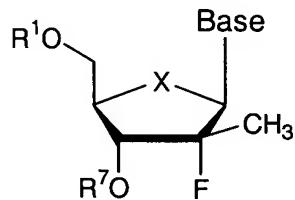
25 Base is



and R¹ is H, R² is OH, R^{2'} is H, R³ is H, R⁴ is NH₂ or OH,
and R⁶ is H.

5

21. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof, in a pharmaceutically acceptable carrier, of the structure:



10

wherein Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

15

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically

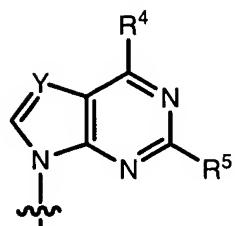
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acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group.

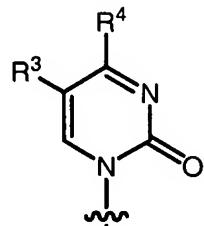
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22. The composition of claim 21, wherein

Base is selected from the group consisting of:



(a)



(b)

Y is N or CH;

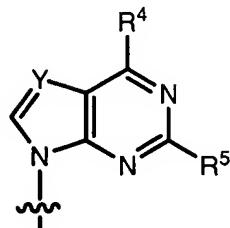
10 R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

15

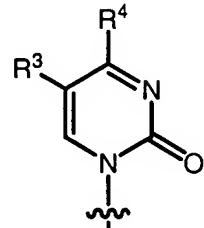
20 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

23. The composition of claim 21, wherein

Base is selected from the group consisting of (a) or (b):



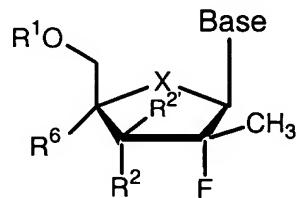
(a)



(b)

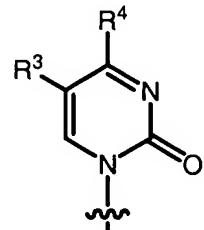
5 and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

10 24. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is



X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

15 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-

phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

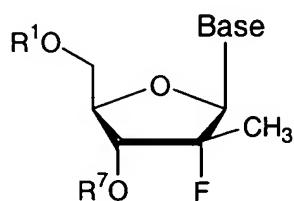
R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl; and

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

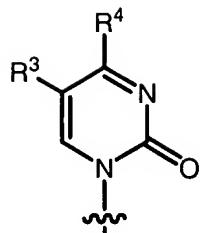
or its pharmaceutically acceptable salt or prodrug thereof and a pharmaceutically acceptable carrier.

A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is



R¹ and R⁷ are independently H, phosphate, including monophosphate,

5 diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower

alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of

10 providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group;

15

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH,

SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I)

lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆

such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower

alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR',

CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

20

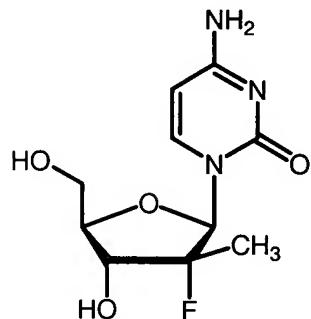
25 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆,

optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

or its pharmaceutically acceptable salt or prodrug thereof, in a pharmaceutically acceptable carrier.

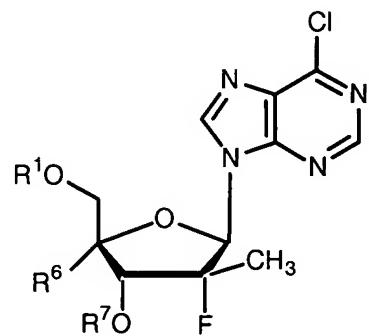
5

26. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof, in a pharmaceutically acceptable carrier of the formula:



10

27. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L), or its pharmaceutically acceptable salt or prodrug thereof, in a pharmaceutically acceptable carrier, of the formula:



15

wherein

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-

5

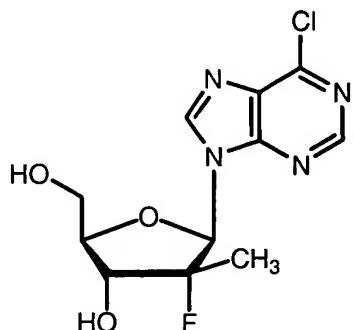
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phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

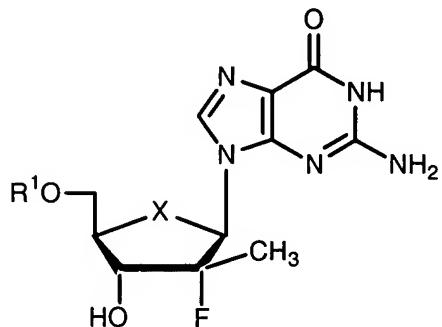
R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro.

28. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof, in a pharmaceutically acceptable carrier, of the formula:



20

29. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof in a pharmaceutically acceptable carrier of the formula:



5

wherein

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

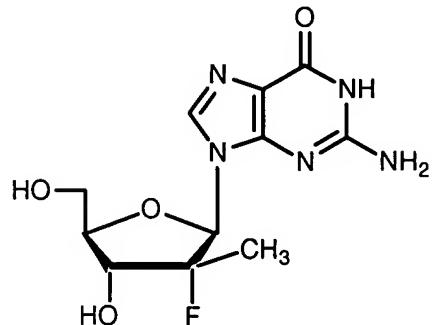
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R¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate;

15

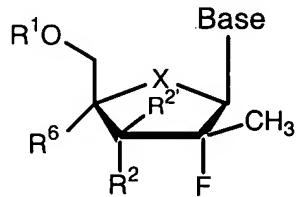
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30. A pharmaceutical composition comprising a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof, in a pharmaceutically acceptable carrier, of the structure:



5

31. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



10

wherein

Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

15 *R*¹ and *R*⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives,

sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F),

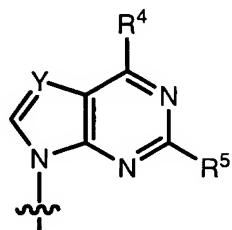
azido (N_3), CHCN , CH_2N_3 , CH_2NH_2 , CH_2NHCH_3 , $\text{CH}_2\text{N}(\text{CH}_3)_2$, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

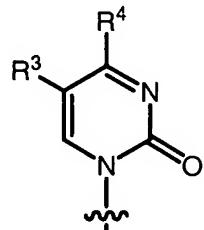
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32. The method of claim 31,

wherein Base is selected from the group consisting of:



(a)



(b)

10

Y is N or CH .

R^3 , R^4 and R^5 are independently H , halogen including F , Cl , Br , I , OH , OR' , SH , SR' , NH_2 , NHR' , NR'_2 , lower alkyl of $\text{C}_1\text{-C}_6$, halogenated (F , Cl , Br , I) lower alkyl of $\text{C}_1\text{-C}_6$ such as CF_3 and $\text{CH}_2\text{CH}_2\text{F}$, lower alkenyl of $\text{C}_2\text{-C}_6$ such as $\text{CH}=\text{CH}_2$, halogenated (F , Cl , Br , I) lower alkenyl of $\text{C}_2\text{-C}_6$ such as $\text{CH}=\text{CHCl}$, $\text{CH}=\text{CHBr}$ and $\text{CH}=\text{CHI}$, lower alkynyl of $\text{C}_2\text{-C}_6$ such as $\text{C}\equiv\text{CH}$, halogenated (F , Cl , Br , I) lower alkynyl of $\text{C}_2\text{-C}_6$, lower alkoxy of $\text{C}_1\text{-C}_6$ such as CH_2OH and $\text{CH}_2\text{CH}_2\text{OH}$, halogenated (F , Cl , Br , I) lower alkoxy of $\text{C}_1\text{-C}_6$, CO_2H , $\text{CO}_2\text{R}'$, CONH_2 , CONHR' , CONR'_2 , $\text{CH}=\text{CHCO}_2\text{H}$, $\text{CH}=\text{CHCO}_2\text{R}'$; and,

15

R' is an optionally substituted alkyl of $\text{C}_1\text{-C}_{12}$ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of $\text{C}_2\text{-C}_6$

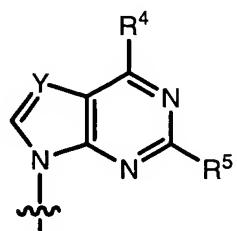
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C_6 , optionally substituted lower alkenyl of C_2 - C_6 , or optionally substituted acyl.

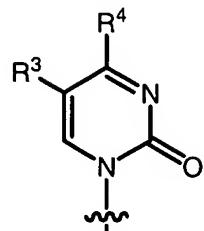
33. The method of claim 31, wherein

5

Base is selected from the group consisting of (a) or (b):



(a)



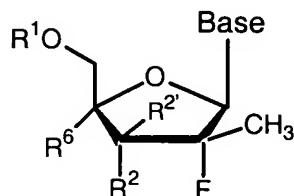
(b)

and wherein R^1 is H, R^2 is OH, R^2' is H, R^3 is H, and R^4 is NH_2 or OH, and R^5 is NH_2 .

10

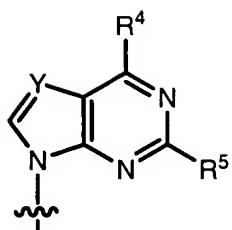
34. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a ($2'R$)-2'-deoxy-2'-fluoro-2'- C -methyl nucleoside (β -D or β -L) of the formula:

15

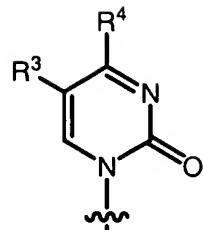


wherein

Base is selected from the group consisting of



(a)



(b)

Y is N or CH;

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I),

5 NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkenyl), SO₂(C₁₋₄ alkynyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R²' can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

10 R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

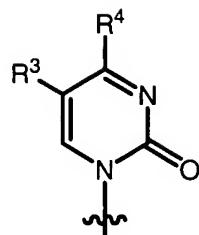
15 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

20 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

25 or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

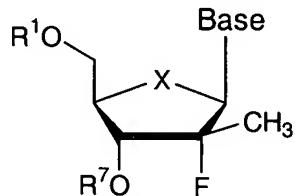
35. The method of claim 34, wherein

Base is



5 and R¹ is H, R² is OH, R^{2'} is H, R³ is H, R⁴ is NH₂ or OH,
and R⁶ is H.

10 36. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof of the structure:



wherein Base is a purine or pyrimidine base;

15 X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives,

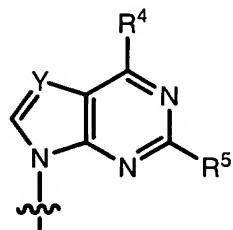
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sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; optionally, in a pharmaceutically acceptable carrier.

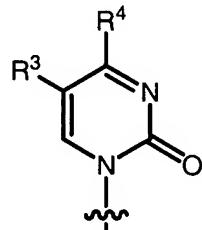
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37. The method of claim 36, wherein

Base is selected from the group consisting of:



(a)



(b)

Y is N or CH;

15 R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

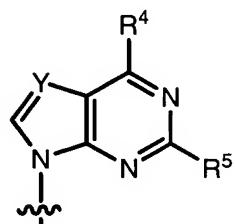
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R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

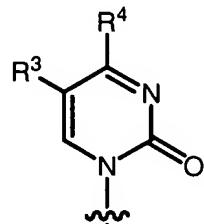
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38. The method of claim 36, wherein

Base is selected from the group consisting of (a) or (b):



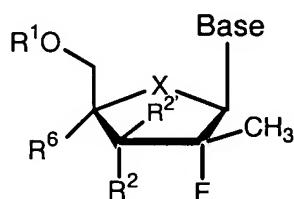
(a)



(b)

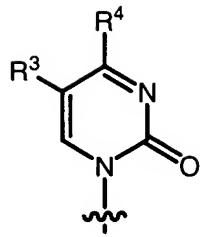
10 and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

15 39. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is



X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

R¹ and R⁷ are independently H, phosphate, including monophosphate, 5 diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; 10 R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), 20 SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are 25 optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I),

NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R²' can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

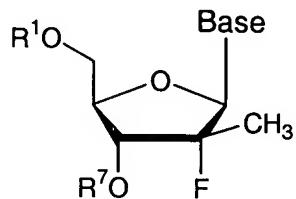
R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl; and,

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier

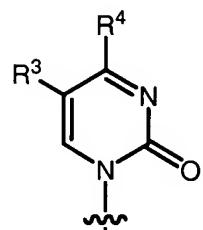
40. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



5

wherein

Base is



R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group;

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I)

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lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and

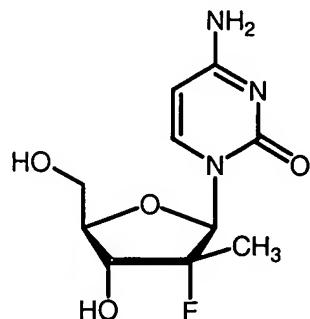
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R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier

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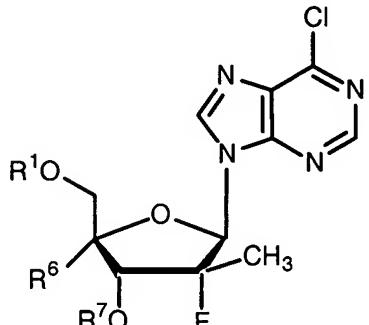
41. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



20

optionally in a pharmaceutically acceptable carrier.

42. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



5

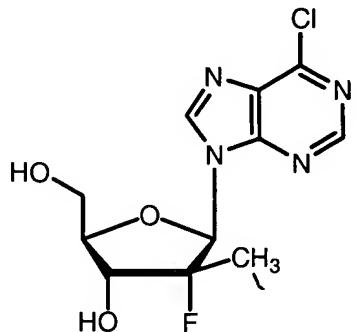
wherein

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

optionally in a pharmaceutically acceptable carrier.

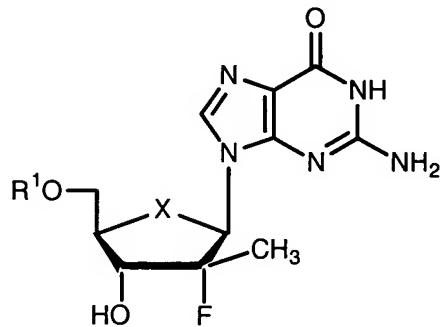
43. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (*2'R*)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



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optionally in a pharmaceutically acceptable carrier.

44. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (*2'R*)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



wherein

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

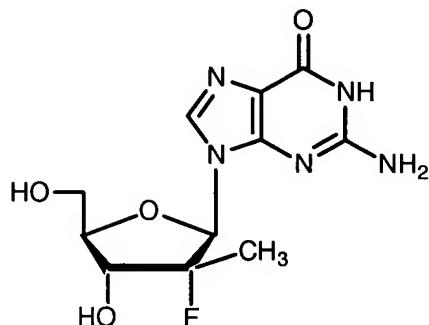
*R*¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-

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phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; optionally in a pharmaceutically acceptable carrier.

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45. A method for the treatment or prophylaxis of hepatitis C infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:

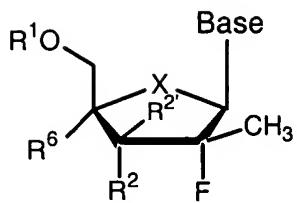


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optionally in a pharmaceutically acceptable carrier.

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46. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W

5 is F, Cl, Br, or I;

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄

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alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

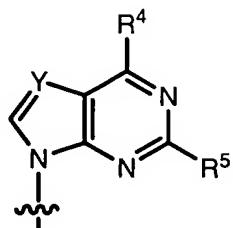
R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

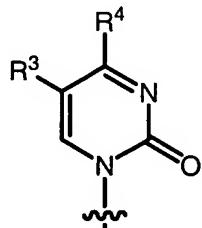
47. The method of claim 46,

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wherein Base is selected from the group consisting of:



(a)



(b)

Y is N or CH.

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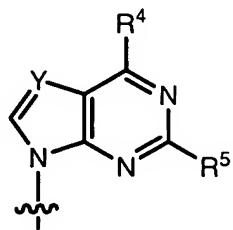
R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

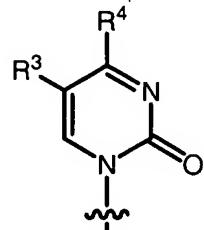
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48. The method of claim 46, wherein

Base is selected from the group consisting of (a) or (b):



(a)



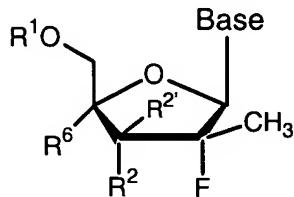
(b)

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and wherein R¹ is H, R² is OH, R^{2'} is H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

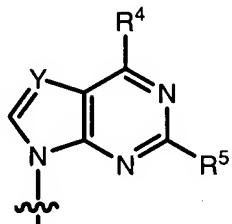
49. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:

5

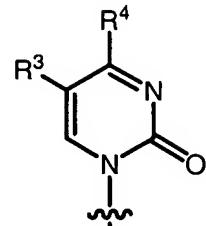


wherein

Base is selected from the group consisting of



(a)



(b)

10

Y is N or CH;

15

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate;

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R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C_{1-C₆}, halogenated (F, Cl, Br, I) lower alkyl of C_{1-C₆} such as CF₃ and CH₂CH₂F, lower alkenyl of C_{2-C₆} such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C_{2-C₆} such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C_{2-C₆} such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C_{2-C₆}, lower alkoxy of C_{1-C₆} such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C_{1-C₆}, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

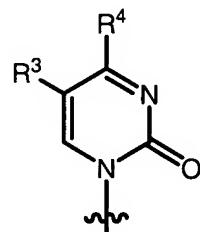
R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

5 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

10 or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

50. The method of claim 49, wherein

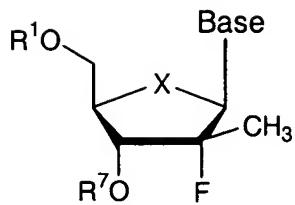
Base is



15

and R¹ is H, R² is OH, R^{2'} is H, R³ is H, R⁴ is NH₂ or OH, and R⁶ is H.

20 51. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof of the structure:



wherein Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

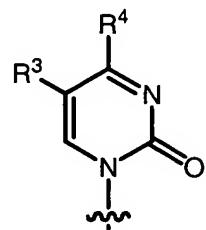
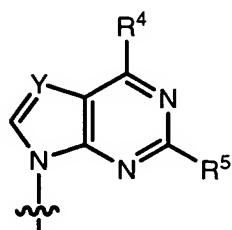
5 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group and optionally a pharmaceutically acceptable carrier.

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52. The method of claim 51, wherein

20 Base is selected from the group consisting of:



(a)

(b)

Y is N or CH;

5

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

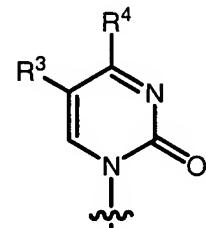
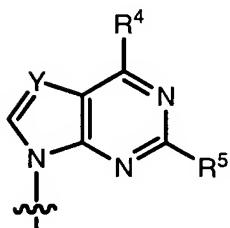
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R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

53. The method of claim 51, wherein

Base is selected from the group consisting of (a) or (b):



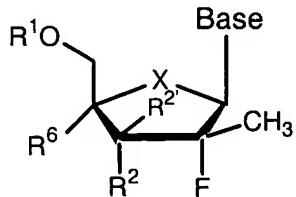
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(a)

(b)

and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

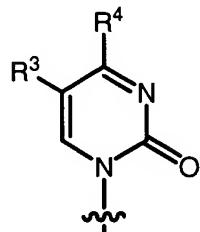
54. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



5

wherein

Base is



X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

10 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

15

20

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C_{1-C₆}, halogenated (F, Cl, Br, I) lower alkyl of C_{1-C₆} such as CF₃ and CH₂CH₂F, lower alkenyl of C_{2-C₆} such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C_{2-C₆} such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C_{2-C₆} such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C_{2-C₆}, lower alkoxy of C_{1-C₆} such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C_{1-C₆}, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

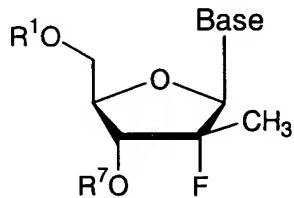
R' is an optionally substituted alkyl of C_{1-C₁₂} (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂₋

C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

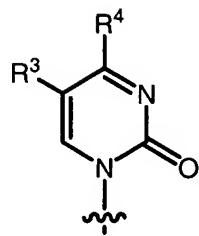
or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

10 55. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



15 wherein

Base is



20 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including

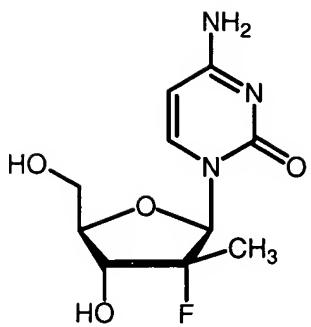
optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group;

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

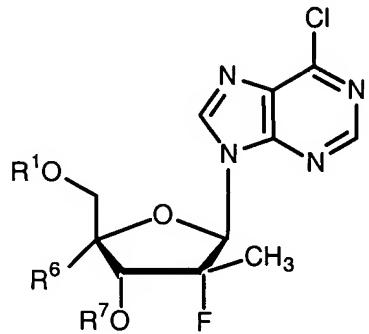
or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

56. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



optionally in a pharmaceutically acceptable carrier.

57. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



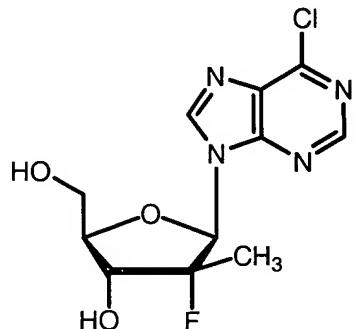
wherein

R¹ and R⁷ are independently H, phosphate, including monophosphate, 10 diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of 15

providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

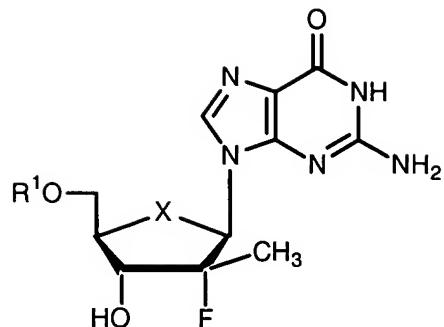
5 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro; and
optionally in a pharmaceutically acceptable carrier.

10 58. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



15 optionally in a pharmaceutically acceptable carrier.

20 59. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



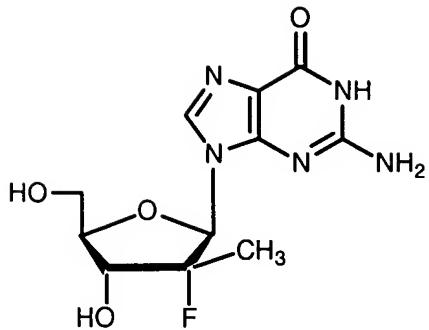
wherein

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

5 R¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate;

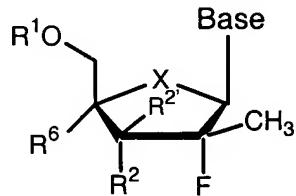
10 optionally in a pharmaceutically acceptable carrier.

60. A method for the treatment or prophylaxis of a rhinovirus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



optionally in a pharmaceutically acceptable carrier.

5 61. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is a purine or pyrimidine base;

10 X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

15 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other

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pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

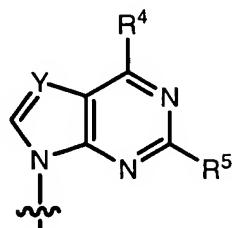
5 R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkenyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkenyl), C(O)O(C₁₋₄ alkynyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkenyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

25 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

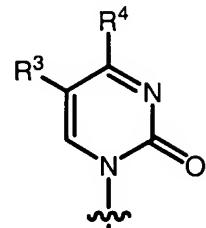
or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

62. The method of claim 61,

wherein Base is selected from the group consisting of:



(a)



(b)

5

Y is N or CH.

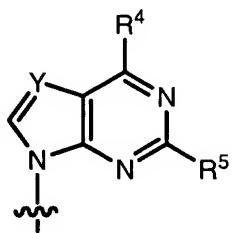
R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR₂, CH=CHCO₂H, CH=CHCO₂R'; and,

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

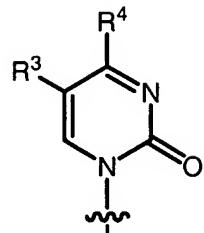
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63. The method of claim 61, wherein

Base is selected from the group consisting of (a) or (b):



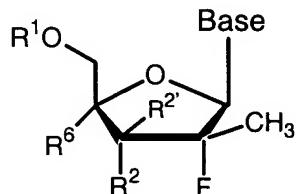
(a)



(b)

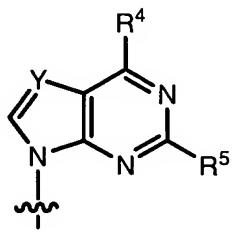
5 and wherein R¹ is H, R² is OH, R^{2'} is H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

10 64. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:

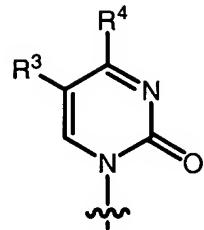


wherein

Base is selected from the group consisting of



(a)



(b)

15

Y is N or CH;

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl)

alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

5 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

10 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

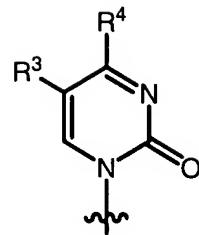
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or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

65. The method of claim 64, wherein

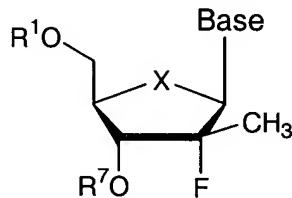
25 Base is



and R¹ is H, R² is OH, R^{2'} is H, R³ is H, R⁴ is NH₂ or OH,
and R⁶ is H.

5

66. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof of the structure:



10

wherein Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a

15

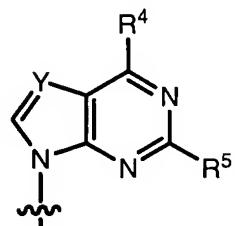
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carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group and

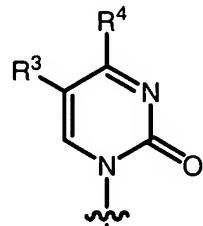
optionally in a pharmaceutically acceptable carrier.

67. The method of claim 66, wherein

Base is selected from the group consisting of:



(a)



(b)

Y is N or CH;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

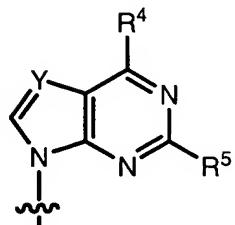
R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-

C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

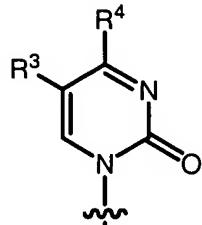
68. The method of claim 66, wherein

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Base is selected from the group consisting of (a) or (b):



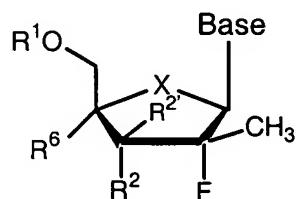
(a)



(b)

and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

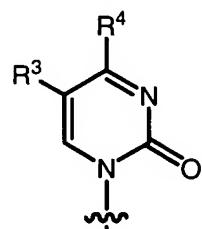
10 69. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

15

Base is



X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

5 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including lower optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

10 R² and R²' are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optinally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl),

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$O_3S(C_{1-4}$ alkyl), $O_3S(C_{1-4}$ alkenyl), NH_2 , $NH(C_{1-4}$ alkyl), $NH(C_{1-4}$ alkenyl), $NH(C_{1-4}$ alkynyl), $NH(C_{1-4}$ acyl), $N(C_{1-4}$ alkyl)₂, $N(C_{1-4}$ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

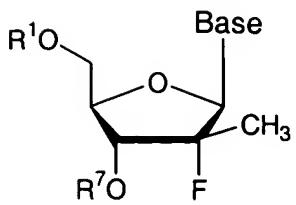
5 R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

10 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

15 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

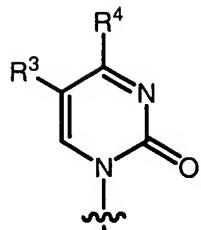
20 or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

25 70. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is



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15

20

R^1 and R^7 are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R^1 or R^7 is independently H or phosphate; R^1 and R^7 can also be linked with cyclic phosphate group;

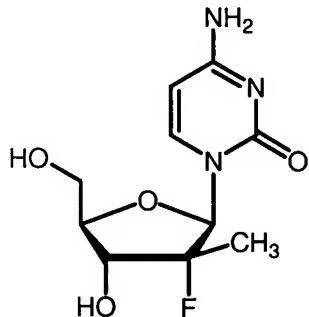
R^3 and R^4 are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆

such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

5 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

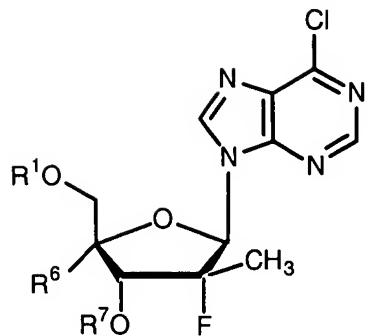
10 or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

71. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof
15 of the formula:



optionally in a pharmaceutically acceptable carrier.

72. A method for the treatment or prophylaxis of a yellow fever virus infection
20 comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



wherein

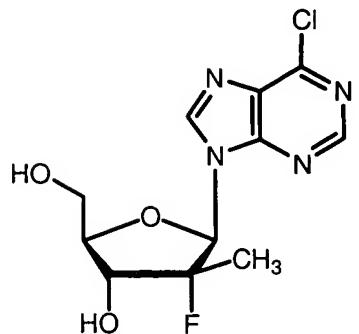
R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro, and

optionally in a pharmaceutically acceptable carrier.

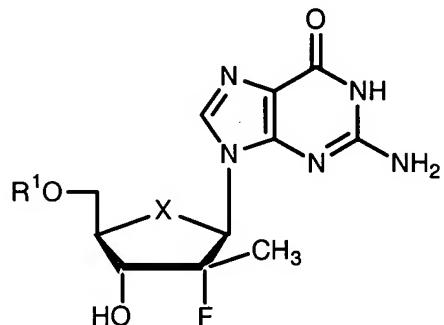
73. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'

fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



optionally in a pharmaceutically acceptable carrier.

5 74. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



10

wherein

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

15

R¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl

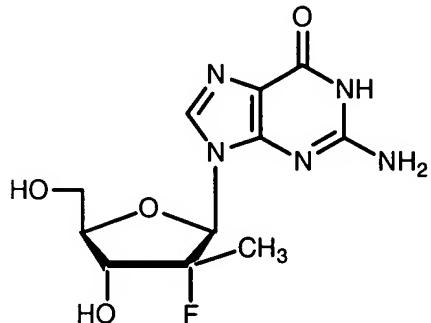
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sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; optionally in a pharmaceutically acceptable carrier

75. A method for the treatment or prophylaxis of a yellow fever virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-

fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof

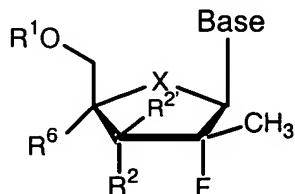
of the formula:



optionally in a pharmaceutically acceptable carrier.

15

76. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

5 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; 10 R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

15 R² and R² are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), 20 SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are 25 optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), 30 SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl),

SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R²' can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

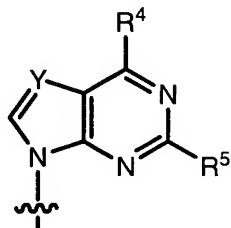
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R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

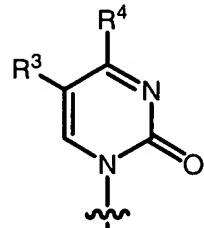
10 or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

77. The method of claim 76,

wherein Base is selected from the group consisting of:



15 (a)



(b)

Y is N or CH.

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆,

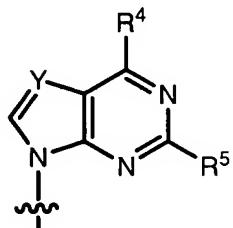
20

lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

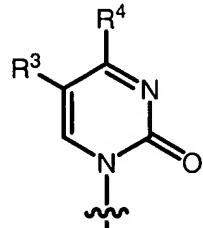
5 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

78. The method of claim 76, wherein

10 Base is selected from the group consisting of (a) or (b):



(a)

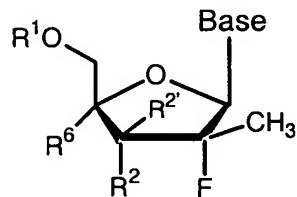


(b)

and wherein R¹ is H, R² is OH, R^{2'} is H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

15

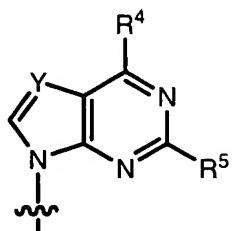
79. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) of the formula:



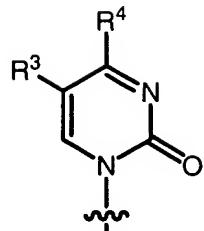
20

wherein

Base is selected from the group consisting of



(a)



(b)

5

Y is N or CH;

10

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

15

20

25

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄

alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkenyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ acyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

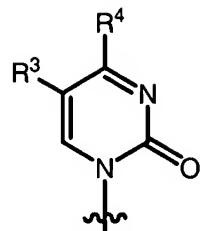
R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

80. The method of claim 79, wherein

5

Base is

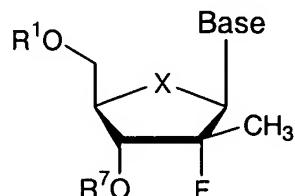


and R^1 is H, R^2 is OH, $\text{R}^{2'}$ is H, R^3 is H, R^4 is NH_2 or OH,
and R^6 is H.

10

81. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a ($2'R$)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof of the structure:

15



wherein Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

20

R^1 and R^7 are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-

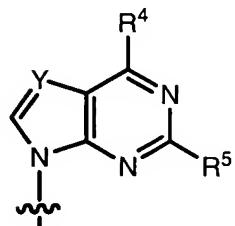
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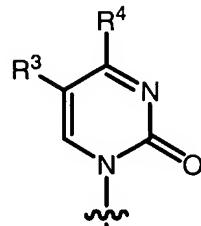
phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group, and optionally a pharmaceutically acceptable carrier.

82. The method of claim 81, wherein

Base is selected from the group consisting of:



(a)



(b)

15

Y is N or CH;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated

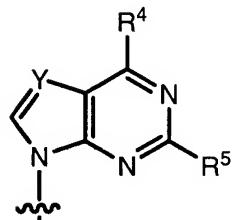
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(F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

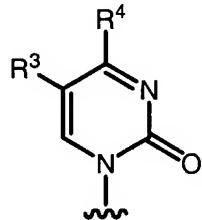
5 R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

83. The method of claim 81, wherein

Base is selected from the group consisting of (a) or (b):



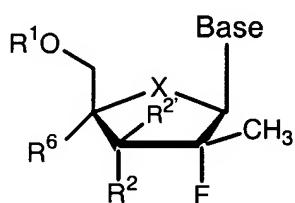
10 (a)



(b)

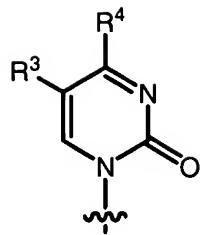
and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

84. A method for the treatment or prophylaxis of a West Nile virus infection
15 comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



wherein

Base is



X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

R¹ and R⁷ are independently H, phosphate, including monophosphate, 5 diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; 10 R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R⁷ are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are 20 optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), 25 wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I),

NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R²' can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

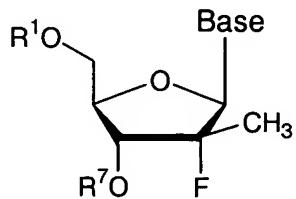
R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

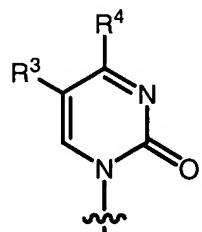
85. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



5

wherein

Base is



R¹ and R⁷ are independently H, phosphate, including monophosphate,
10 diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group;
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R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I)

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lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

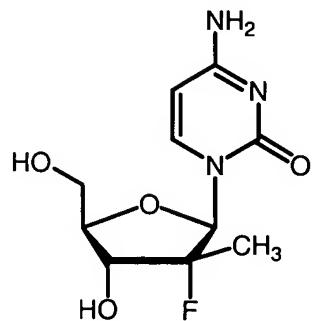
10

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

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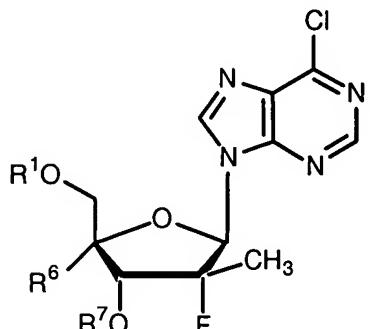
86. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



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optionally in a pharmaceutically acceptable carrier.

87. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



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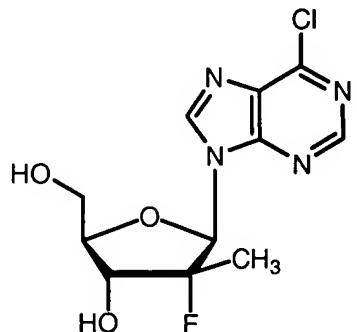
wherein

R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

10
15
20 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro and,

optionally in a pharmaceutically acceptable carrier.

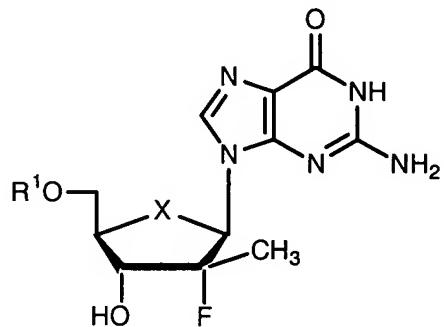
88. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



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and optionally a pharmaceutically acceptable carrier.

89. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



wherein

X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

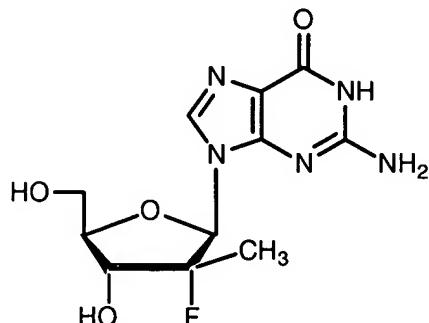
*R*¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-

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phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; optionally in a pharmaceutically acceptable carrier.

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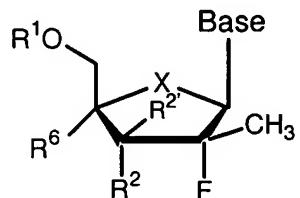
90. A method for the treatment or prophylaxis of a West Nile virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



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optionally in a pharmaceutically acceptable carrier.

91. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



5

wherein

Base is a purine or pyrimidine base;

X is O, S, CH_2 , Se, NH, N-alkyl, CHW (R , S , or racemic), $C(W)_2$, wherein W is F, Cl, Br, or I;

10 R^1 and R^7 are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R^1 is H or phosphate; R^2 is H or phosphate; R^1 and R^2 or R^7 can also be linked with cyclic phosphate group;

15

20 R^2 and $R^{2'}$ are independently H, C_{1-4} alkyl, C_{1-4} alkenyl, C_{1-4} alkynyl, vinyl, N_3 , CN, Cl, Br, I, NO_2 , $C(O)O(C_{1-4}$ alkyl), $C(O)O(C_{1-4}$ alkyl), $C(O)O(C_{1-4}$ alkynyl), $C(O)O(C_{1-4}$ alkenyl), $O(C_{1-4}$ acyl), $O(C_{1-4}$ alkyl), $O(C_{1-4}$ alkenyl), $S(C_{1-4}$ acyl), $S(C_{1-4}$ alkyl), $S(C_{1-4}$ alkynyl), $S(C_{1-4}$ alkenyl), $SO(C_{1-4}$ acyl), $SO(C_{1-4}$ alkyl), $SO(C_{1-4}$ alkynyl), $SO(C_{1-4}$ alkenyl),

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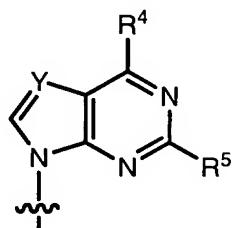
SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R²' can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

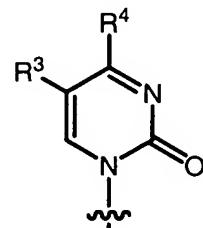
or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

92. The method of claim 91,

wherein Base is selected from the group consisting of:



(a)



(b)

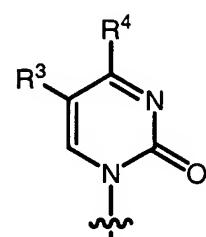
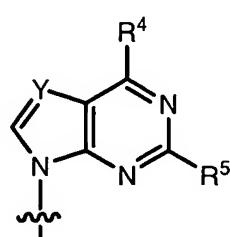
Y is N or CH.

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

93. The method of claim 91, wherein

Base is selected from the group consisting of (a) or (b):



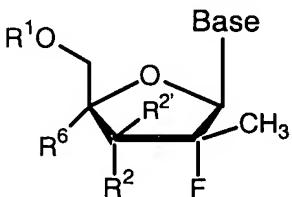
20

(a)

(b)

and wherein R¹ is H, R² is OH, R^{2'} is H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

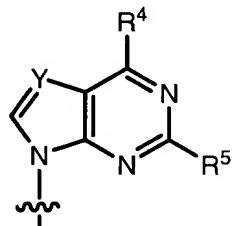
94. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) of the formula:



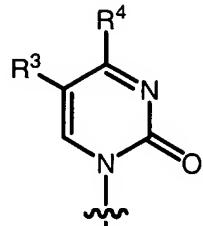
5

wherein

Base is selected from the group consisting of



(a)



(b)

10

Y is N or CH;

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R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate;

20

R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C_{1-C₆}, halogenated (F, Cl, Br, I) lower alkyl of C_{1-C₆} such as CF₃ and CH₂CH₂F, lower alkenyl of C_{2-C₆} such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C_{2-C₆} such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C_{2-C₆} such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C_{2-C₆}, lower alkoxy of C_{1-C₆} such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C_{1-C₆}, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

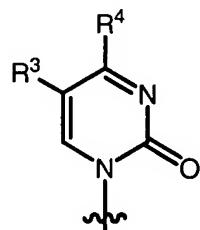
R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl;

5 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

10 or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

95. The method of claim 94, wherein

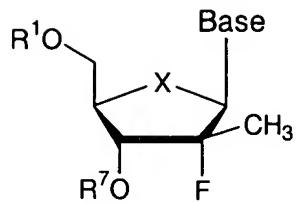
Base is



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and R¹ is H, R² is OH, R^{2'} is H, R³ is H, R⁴ is NH₂ or OH, and R⁶ is H.

20 96. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) or its pharmaceutically acceptable salt or prodrug thereof of the structure:



wherein Base is a purine or pyrimidine base;

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and,

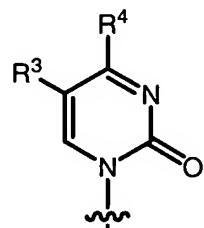
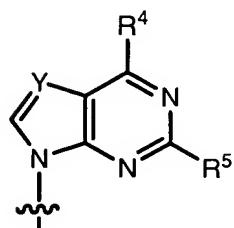
5 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group, and optionally a pharmaceutically acceptable carrier.

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97. The method of claim 96, wherein

20 Base is selected from the group consisting of:



(a)

(b)

Y is N or CH;

5

R³, R⁴ and R⁵ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

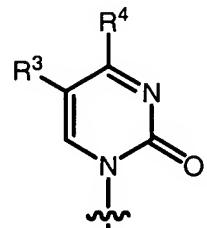
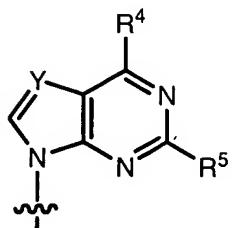
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R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

98. The method of claim 96, wherein

Base is selected from the group consisting of (a) or (b):



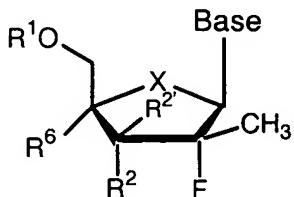
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(a)

(b)

and wherein R¹ and R⁷ are H, R³ is H, and R⁴ is NH₂ or OH, and R⁵ is NH₂.

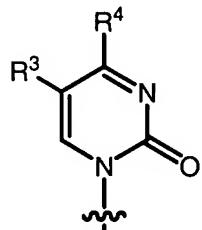
99. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



5

wherein

Base is



X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I;

10 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid (or racemic mixture), a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate; R² is H or phosphate; R¹ and R² or R⁷ can also be linked with cyclic phosphate group;

15

20

R² and R^{2'} are independently H, C₁₋₄ alkyl, C₁₋₄ alkenyl, C₁₋₄ alkynyl, vinyl, N₃, CN, Cl, Br, F, I, NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₁₈ acyl)₂, wherein alkyl, alkynyl, alkenyl and vinyl are optionally substituted by N₃, CN, one to three halogen (Cl, Br, F, I), NO₂, C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkyl), C(O)O(C₁₋₄ alkynyl), C(O)O(C₁₋₄ alkenyl), O(C₁₋₄ acyl), O(C₁₋₄ alkyl), O(C₁₋₄ alkenyl), S(C₁₋₄ acyl), S(C₁₋₄ alkyl), S(C₁₋₄ alkynyl), S(C₁₋₄ alkenyl), SO(C₁₋₄ acyl), SO(C₁₋₄ alkyl), SO(C₁₋₄ alkynyl), SO(C₁₋₄ alkenyl), SO₂(C₁₋₄ acyl), SO₂(C₁₋₄ alkyl), SO₂(C₁₋₄ alkynyl), SO₂(C₁₋₄ alkenyl), O₃S(C₁₋₄ acyl), O₃S(C₁₋₄ alkyl), O₃S(C₁₋₄ alkenyl), NH₂, NH(C₁₋₄ alkyl), NH(C₁₋₄ alkenyl), NH(C₁₋₄ alkynyl), NH(C₁₋₄ acyl), N(C₁₋₄ alkyl)₂, N(C₁₋₄ acyl)₂, OR⁷; R² and R^{2'} can be linked together to form a vinyl optionally substituted by one or two of N₃, CN, Cl, Br, F, I, NO₂;

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C_{1-C₆}, halogenated (F, Cl, Br, I) lower alkyl of C_{1-C₆} such as CF₃ and CH₂CH₂F, lower alkenyl of C_{2-C₆} such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C_{2-C₆} such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C_{2-C₆} such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C_{2-C₆}, lower alkoxy of C_{1-C₆} such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C_{1-C₆}, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R'; and,

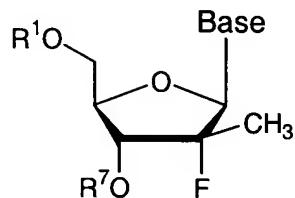
R' is an optionally substituted alkyl of C_{1-C₁₂} (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C_{2-C₆}

C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

5 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro;

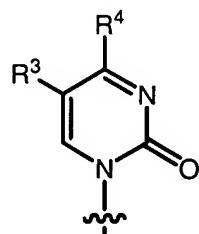
or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

10 100. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L) of the formula:



15 wherein

Base is



20 R¹ and R⁷ are independently H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including

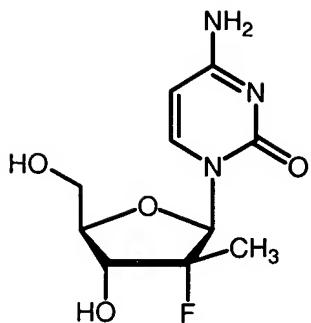
optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group;

R³ and R⁴ are independently H, halogen including F, Cl, Br, I, OH, OR', SH, SR', NH₂, NHR', NR'₂, lower alkyl of C₁-C₆, halogenated (F, Cl, Br, I) lower alkyl of C₁-C₆ such as CF₃ and CH₂CH₂F, lower alkenyl of C₂-C₆ such as CH=CH₂, halogenated (F, Cl, Br, I) lower alkenyl of C₂-C₆ such as CH=CHCl, CH=CHBr and CH=CHI, lower alkynyl of C₂-C₆ such as C≡CH, halogenated (F, Cl, Br, I) lower alkynyl of C₂-C₆, lower alkoxy of C₁-C₆ such as CH₂OH and CH₂CH₂OH, halogenated (F, Cl, Br, I) lower alkoxy of C₁-C₆, CO₂H, CO₂R', CONH₂, CONHR', CONR'₂, CH=CHCO₂H, CH=CHCO₂R';

R' is an optionally substituted alkyl of C₁-C₁₂ (particularly when the alkyl is an amino acid residue), cycloalkyl, optionally substituted alkynyl of C₂-C₆, optionally substituted lower alkenyl of C₂-C₆, or optionally substituted acyl.

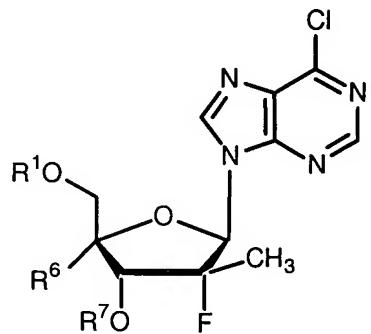
or its pharmaceutically acceptable salt or prodrug thereof, optionally in a pharmaceutically acceptable carrier.

101. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



optionally in a pharmaceutically acceptable carrier.

102. A method for the treatment or prophylaxis of a Dengue virus infection
5 comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-
fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof
of the formula:



wherein

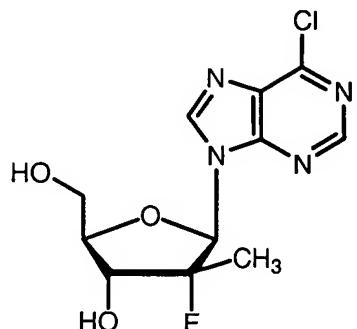
10 R^1 and R^7 are independently H, phosphate, including monophosphate,
diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically
15

acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ or R⁷ is independently H or phosphate; R¹ and R⁷ can also be linked with cyclic phosphate group; and,

5 R⁶ is an optionally substituted alkyl (including lower alkyl), cyano (CN), CH₃, OCH₃, OCH₂CH₃, hydroxy methyl (CH₂OH), fluoromethyl (CH₂F), azido (N₃), CHCN, CH₂N₃, CH₂NH₂, CH₂NHCH₃, CH₂N(CH₃)₂, alkyne (optionally substituted), or fluoro and,
optionally in a pharmaceutically acceptable carrier.

10

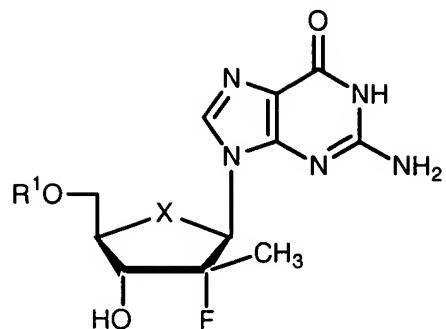
103. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



15

and optionally a pharmaceutically acceptable carrier.

104. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof of the formula:



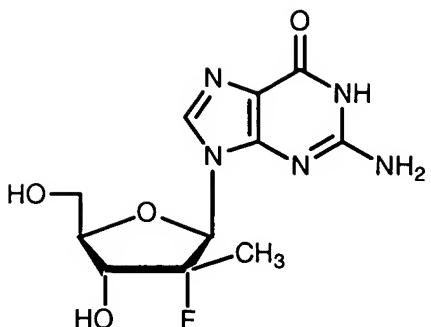
wherein

X is O, S, CH₂, Se, NH, N-alkyl, CHW (R, S, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and

5 R¹ is H, phosphate, including monophosphate, diphosphate, triphosphate, or a stabilized phosphate prodrug, H-phosphonate, including stabilized H-phosphonates, acyl, including optionally substituted phenyl and lower acyl, alkyl, including lower alkyl, O-substituted carboxyalkylamino or its peptide derivatives, sulfonate ester, including alkyl or arylalkyl sulfonyl, including methanesulfonyl and benzyl, wherein the phenyl group is optionally substituted, a lipid, including a phospholipid, an L or D-amino acid, a carbohydrate, a peptide, a cholesterol, or other pharmaceutically acceptable leaving group which when administered *in vivo* is capable of providing a compound wherein R¹ is H or phosphate;

10 optionally in a pharmaceutically acceptable carrier.

105. A method for the treatment or prophylaxis of a Dengue virus infection comprising administering to a host an antivirally effective amount of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D) or its pharmaceutically acceptable salt or prodrug thereof
20 of the formula:



optionally in a pharmaceutically acceptable carrier.

106. The method of 31, wherein the antivirally effective amount of (2'R)-2'-deoxy-
 5 2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
 one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
 interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
 interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
 10 levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
 inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
 inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
 derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
 derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
 15 amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
 polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic
 vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine
 phytosome; and mycophenolate.

20 107. The method of 41, wherein the antivirally effective amount of (2'R)-2'-deoxy-
 2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
 one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
 interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;

interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

108. The method of 43, wherein the antivirally effective amount of (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least one treatment selected from the group consisting of: interferon, including interferon alpha 2a, interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

109. The method of 45, wherein the antivirally effective amount of (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least one treatment selected from the group consisting of: interferon, including interferon alpha 2a,

interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; 5 levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; 10 polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

110. The method of 46, wherein the antivirally effective amount of (2'R)-2'-deoxy-
15 2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least one treatment selected from the group consisting of: interferon, including interferon alpha 2a, interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; 20 levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; 25 polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

111. The method of 56, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
5 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
10 derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic
vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine
15 phytosome; and mycophenolate.

112. The method of 58, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
20 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
25 derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic

vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

113. The method of 60, wherein the antivirally effective amount of (2'R)-2'-deoxy-
5 2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
10 interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
15 amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic
vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine
phytosome; and mycophenolate.

20 114. The method of 61, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
25 interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
30 derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;

amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

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115. The method of 71, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
10 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
15 inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic
vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine
20 phytosome; and mycophenolate.

116. The method of 73, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
25 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
30 inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine

derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic 5 vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

117. The method of 75, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
10 one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
15 inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic
20 vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine
phytosome; and mycophenolate.

118. The method of 76, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
25 one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
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inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

10 119. The method of 86, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;
15 interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin;
levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase
inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase
inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine
derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside
20 derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene;
amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide;
polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic
vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine
phytosome; and mycophenolate.

25 120. The method of 88, wherein the antivirally effective amount of (2'R)-2'-deoxy-
2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least
one treatment selected from the group consisting of: interferon, including interferon alpha 2a,
interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau
30 and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin;

interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

121. The method of 90, wherein the antivirally effective amount of (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least one treatment selected from the group consisting of: interferon, including interferon alpha 2a, interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

122. The method of 91, wherein the antivirally effective amount of (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least one treatment selected from the group consisting of: interferon, including interferon alpha 2a,

interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or levovirin; 5 levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; 10 polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

123. The method of 101, wherein the antivirally effective amount of (2'R)-2'-
15 deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at least one treatment selected from the group consisting of: interferon, including interferon alpha 2a, interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma, interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin 12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or 20 levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E; squalene; 25 amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

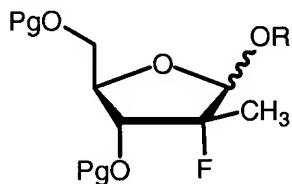
124. The method of 103, wherein the antivirally effective amount of (2'R)-2'-
deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at
least one treatment selected from the group consisting of: interferon, including interferon
alpha 2a, interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma,
interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin
12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or
levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a
5 helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B
polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a
thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or
nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E;
squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a
benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin
inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-
10 phosphatidylcholine phytosome; and mycophenolate.

125. The method of 105, wherein the antivirally effective amount of (2'R)-2'-
deoxy-2'-fluoro-2'-C-methyl nucleoside is administered in combination or alternation with at
least one treatment selected from the group consisting of: interferon, including interferon
alpha 2a, interferon alpha 2b, a pegylated interferon, interferon beta, interferon gamma,
interferon tau and interferon omega; an interleukin, including interleukin 10 and interleukin
12; ribavirin; interferon alpha or pegylated interferon alpha in combination with ribavirin or
levovirin; levovirin; a protease inhibitor including an NS3 inhibitor, a NS3-4A inhibitor; a
20 helicase inhibitor; a polymerase inhibitor including HCV RNA polymerase and NS5B
polymerase inhibitor; gliotoxin; an IRES inhibitor; and antisense oligonucleotide; a
thiazolidine derivative; a benzamilide, a ribozyme; another nucleoside, nucleoside prodrug or
nucleoside derivative; a 1-amino-alkylcyclohexane; an antioxidant including vitamin E;
squalene; amantadine; a bile acid; N-(phosphonoacetyl)-L-aspartic acid; a
benzenedicarboxamide; polyadenylic acid; a benzimidazoles; thymosin; a beta tubulin
25 inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-
phosphatidylcholine phytosome; and mycophenolate.

inhibitor; a prophylactic vaccine; an immune modulator, an IMPDH inhibitor; silybin-phosphatidylcholine phytosome; and mycophenolate.

126. A method of synthesizing a (*2'R*)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside

5 (β -D or β -L) comprising glycosylation of a nucleobase with an intermediate structure:

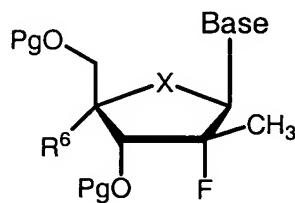


1-4

wherein R is lower alkyl, acyl, benzoyl, or mesyl; and Pg is any acceptable protecting group consisting of but not limited to C(O)-alkyl, C(O)Ph, C(O)aryl, CH₃, CH₂-alkyl, CH₂-alkenyl, CH₂Ph, CH₂-aryl, CH₂O-alkyl, CH₂O-aryl, SO₂-alkyl, SO₂-aryl, *tert*-butyldimethylsilyl, *tert*-butyldiphenylsilyl, or both Pg's may come together to form a 1,3-(1,1,3,3-tetraisopropyldisiloxanylidene).

127. A method of synthesizing a (*2'R*)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside

15 (β -D or β -L) comprising selective deprotection of either Pg in an intermediate of the structure:



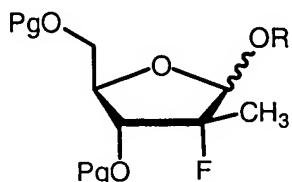
2-5

wherein, X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂, wherein W is F, Cl, Br, or I; and Pg is independently any pharmaceutically acceptable protecting group

selected from the group consisting of C(O)-alkyl, C(O)Ph, C(O)aryl, CH₃, CH₂-alkyl, CH₂-alkenyl, CH₂Ph, CH₂-aryl, CH₂O-alkyl, CH₂O-aryl, SO₂-alkyl, SO₂-aryl, *tert*-butyldimethylsilyl, *tert*-butyldiphenylsilyl, or both Pg's may come together to form a 1,3-(1,1,3,3-tetraisopropyldisiloxanylidene).

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128. An intermediate in the synthesis of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L), wherein the intermediate is of the structure:

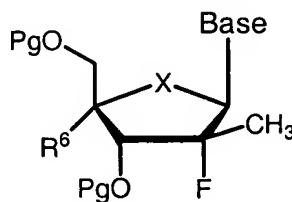


1-4

10 wherein R is lower alkyl, acyl, benzoyl, or mesyl; and Pg is any acceptable protecting group consisting of but not limited to C(O)-alkyl, C(O)Ph, C(O)aryl, CH₃, CH₂-alkyl, CH₂-alkenyl, CH₂Ph, CH₂-aryl, CH₂O-alkyl, CH₂O-aryl, SO₂-alkyl, SO₂-aryl, *tert*-butyldimethylsilyl, *tert*-butyldiphenylsilyl, or both Pg's may come together to form a 1,3-(1,1,3,3-tetraisopropyldisiloxanylidene).

15

129. An intermediate in the synthesis of a (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β -D or β -L), wherein the intermediate is of the structure:



2-5

wherein, X is O, S, CH₂, Se, NH, N-alkyl, CHW (*R*, *S*, or racemic), C(W)₂,
wherein W is F, Cl, Br, or I; and Pg is independently any pharmaceutically
acceptable protecting group selected from the group consisting of C(O)-alkyl,
C(O)Ph, C(O)aryl, CH₃, CH₂-alkyl, CH₂-alkenyl, CH₂Ph, CH₂-aryl, CH₂O-
5 alkyl, CH₂O-aryl, SO₂-alkyl, SO₂-aryl, *tert*-butyldimethylsilyl, *tert*-
butyldiphenylsilyl, or both Pg's may come together to form a 1,3-(1,1,3,3-
tetraisopropyldisiloxanylidene).